UNITED STATES PATENT AND TRADEMARK OFFICE

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ART UNIT	PAPER NUMBER
2621	

DATE MAILED: 02/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/941,427	PETERSON, JOHN
	Examiner	**Art Unit**	
	Dennis Rosario	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 October 2004*.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

  4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 August 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

  Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

  Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

  a)☐ All   b)☐ Some * c)☐ None of:

    1.☐ Certified copies of the priority documents have been received.

    2.☐ Certified copies of the priority documents have been received in Application No. _____.

    3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

  * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/18/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____ .

DETAILED ACTION

Response to Amendment

1.   The amendment was received on October 18, 2004. Claims 1-30 are pending.

Response to Arguments

2.   Applicant's arguments filed 10/18/2004 on page 14,lines 24-26 and page 16,

lines 4-6 have been fully considered but they are not persuasive.

Page 14, lines 24-26 states, "Shum does not disclose or suggest applying a

transform to each image in a composite image to change a composite image having a

first center of projection to a composit[e] image having a second center of projection."

However, Shum does disclose applying a transform ("Hough transform" in col. 7,

line 27.) to each image (Fig. 3, numerals 302a-n) in a composite image (Fig. 3,num. 300

is "a set of concentric... mosaics (col. 2, lines 58,59) [which corresponds to the claimed

composite image because each mosaic is combined concentrically to form an overall

composite image or mosaic].") to change a composite image (Fig. 3, numerals 302c and

302b are mosaics that are locally warped together in col. 11, lines 27-31. Where 302c is

warped into 302b because of the direction of viewing as shown by the arrow 306 of fig.

3.) having a first center of projection (Fig. 3,num. 302b is a first center of projection or

"new image" in col. 11, line 29 with respect to image 302c.) to a composit[e] image (Fig.

3, num. 302b and 302a) having a second center of projection (Fig. 3,num. 302b is a

second center of projection or "new image" in col. 11, line 29 with respect to image

302a.)." Note that a direction of viewing as shown in fig. 3, num. 306 determines which

image is a new image with respect to another image.

3.   Applicant's arguments filed 10/18/2004 on page 15, lines 19-21 have been fully

considered but they are not persuasive.

Page 15, lines 19-21 states, "Shum, however, does not transform a composite

image that has been corrected for perspective distortion about a first center of projection

to create a second composite image corrected for perspective distortion about a

different center of projection."

However, Shum does transform (A "Hough transform" in col. 7, line 27 is used for

"warping... mosaics (col. 11, lines 16,17).") a composite image (Fig. 3, num. 302c and

302b are mosaics that are locally warped together in col. 11, lines 27-31.) that has been

corrected for perspective distortion (The warping transform "preserves structural

features (col. 10, lines 12,13)." Note that structural features can include features related

to perspective such as "edges" in col. 10, line 8.) about a first center of projection (Fig.

3,num. 302b is a first center of projection or "new image" in col. 11, line 29 with respect

to image 302c.) to create a second composite image (Fig. 3, num. 302b and 302a is a

second composite image where 302b is a new image or created image, using the

warping transform, with respect to num. 302a.) corrected for perspective distortion (The

warping transform "preserves structural features (col. 10, lines 12,13)." Note that

structural features can include features related to perspective such as "edges" in col.

10, line 8.) about a different center of projection (Fig. 3,num. 302b is a second center of

projection or "new image" in col. 11, line 29 with respect to image 302a.).

4.   Applicant's arguments on page 15,lines 23-26 with respect to claim 1 have been

considered but are moot in view of the new ground(s) of rejection using Shum et al. (US

Patent 6,643,413 B1).

Claim Objections

5.   The following quotations of 37 CFR § 1.75(a) is the basis of objection:

> (a) The specification must conclude with a claim particularly pointing out and distinctly claiming
> the subject matter which the applicant regards as his invention or discovery.

6.   Claim 15 is objected to under 37 CFR § 1.75(a) as failing to particularly point out

and distinctly claim the subject matter which the applicant regards as his invention or

discovery.

Claim 15, line 6:"the perspective" ought to be amended to "a perspective".

Claim Rejections - 35 USC § 102

7.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public
> use or on sale in this country, more than one year prior to the date of application for patent in the United
> States.

8.   Claims 1-4,11-19 and 26-30 are rejected under 35 U.S.C. 102(b) as being

anticipated by Shum et al. (US Patent 6,643,413 B1).

Regarding claims 1,15,16 and 30, Shum et al. discloses a computer-

implemented image processing (fig. 1 shows a computer 20 with a medium 29.)

method, comprising:

a)   providing a composite image (fig. 3,num. 302b is a mosaic image or "new

image" in col. 11, line 29.) derived (Fig. 3,num. 302b is a mosaic image or "new image"

in col. 11, line 29 derived from mosaic images 302c, 302b and 302a.) from a plurality of

component images (fig. 3,num. 302c,302b and 302a are mosaics.) including a first

image (fig. 3,num. 302c is a mosaic.) and a second image (fig. 3, num. 302b is a

mosaic.), the composite image (fig. 3,num. 302b is a mosaic image or "new image" in

col. 11, line 29.) including the first image (fig. 3,num. 302c is a mosaic.) as a center of

projection (fig. 3,num. 302c is a mosaic image or "new image" in col. 11, line 29.) and a

modified version (The second image of fig. 3, num. 302b is modified or warped into the

first image of fig. 3,num. 302c.) of the second image (fig. 3, num. 302b is a mosaic.), the

modified version of the second image (The second image of fig. 3, num. 302b is

modified or warped into the first image of fig. 3,num. 302c.) having been corrected for

perspective distortion (The warping transform "preserves structural features (col. 10,

lines 12,13)." Note that structural features can include features related to perspective

such as "edges" in col. 10, line 8.) relative to the first image (fig. 3,num. 302c is a

mosaic.);

b)   receiving a single user input including an instruction to change [the] **a**

perspective (Fig. 11,num. 1104: MOVEMENT OF VIRTUAL CAMERA) of the composite

image (fig. 3,num. 302b is a mosaic image or "new image" in col. 11, line 29 and shown

in fig. 11, num. 1102: CONSTRUCTION OF MANIFOLD MOSAICS.) to make the

second image (fig. 3, num. 302b is a mosaic.) the center of projection (fig. 3,num. 302b

is a mosaic image or "new image" in col. 11, line 29 based upon the MOVEMENT OF

VIRTUAL CAMERA and shown in fig. 3,num. 306.) ; and

c)   in response to the input (Fig. 11,num. 1104: MOVEMENT OF VIRTUAL

CAMERA), automatically:

c1)   determining a transformation (A "Hough transform" in col. 7, line 27

is "augmented" in col. 7, line 30. Thus a transform is augmented from another

transform, so a transform is determined.) for mapping a set of reference points (fig. 5

shows a set of reference points,502-508, that correspond to the second modified

image.) in the modified version of the second image (The second image of fig. 3, num.

302b is modified or warped into the first image of fig. 3,num. 302c.) to a set of reference

points (Fig. 4 shows rays 402-408 of "view points...[in] ray space" in col. 6, lines 42-50

that correspond to the second image of fig. 3, num. 302.) in the second image (fig. 3,

num. 302b);

c2)   applying the transform (A "Hough transform" in col. 7, line 27) to

each of the plurality of derived (Fig. 3,num. 302b is a mosaic image or "new image" in

col. 11, line 29 derived or transformed via the Hough transform from mosaic images

302c,302b and 302a.) component images (fig. 3,num. 302c,302b and 302a are

mosaics.) in the composite image (fig. 3,num. 302b is a mosaic image or "new image" in

col. 11, line 29.) to generate a plurality of transformed component images (In fig. 10, line

"segments" in col. 11, line 18 shown in r_1 ,r_0 and $-r_1$ are transformed component images

that correspond to component images of fig. 3,num. 302c,302b and 302a, respectively.),

each of the transformed component images ("segments" in col. 11, line 18) having the

second image (fig. 3, num. 302b or line segment r_0.) as their center of projection (Line

segments r_1 and $-r_1$ have the second image of fig. 3,num. 302b or r_0 as their center of

projection depending on which relative direction as shown as arrows on the ends of a

line 1002 of fig. 10 is traveled or hopped as mentioned in col. 11, lines 15-17. If the

direction or travel or hopping is from the line segment of $-r_1$ to r_0, the center of

projection is r_0, because $-r_1$ is projected or "warp[ed]" in col. 11, line 16 to r_0. A similar

case is presented when hopping from r_1 to r_0. Thus, r_0 is the center of projection for a

plurality of images.), each of the transformed component images ("segments" in col. 11,

line 18) being corrected for perspective distortion (The warping transform "preserves

structural features (col. 10, lines 12,13)." Note that structural features can include

features related to perspective such as "edges" in col. 10, line 8.) relative to the second

image (fig. 3, num. 302b or line segment r_0.); and

c3)   merging (fig. 11, num. 1106: RENDERING OF IMAGE merges or

"locally warps" in col. 13, line 43 mosaic images to create a "new image" in col. 13, line

42.) the second image (fig. 3, num. 302b or line segment r_o.) and the plurality of the

transformed component images (In fig. 10, line "segments" in col. 11, line 18 shown in r_1

,r_o and –r_1 are transformed component images that correspond to component images of

fig. 3,num. 302c,302b and 302a, respectively.) corrected for perspective distortion (The

warping transform "preserves structural features (col. 10, lines 12,13)." Note that

structural features can include features related to perspective such as "edges" in col.

10, line 8.) relative to the second image (fig. 3, num. 302b or line segment r_o.) to form a

second composite image (Fig. 3,num. 302b is a composite image from images 302a

and 302b.) that has the second image (Fig. 3,num. 302b) as its center of projection

(Line segments r_1 and –r_1 have the second image of fig. 3,num. 302b or r_o as their

center of projection based on a direction or hopping as shown as arrows on the ends of

a line 1002 of fig. 10 as mentioned in col. 11, lines 15-17.).

Claims 2,3,4,17,18 and 19 are rejected the same as claim 15. Thus, argument

similar to that presented above for claim 15 is equally applicable to claims 2,3,4,17,18

and 19.

Claim Rejections - 35 USC § 103

9.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

10.   Claims 5-10 and 20-25 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Shum et al. (US Patent 6,643,413 B1) and in view of Heckbert

(Master's Thesis from the IDS).

Regarding claim 5, Shum et al. does not disclose the limitation of claim 5, but

does suggest a correspondence of points between images in col. 1, lines 31-34 and

performs a correspondence function with points in col. 7, lines 45,46.

However, Heckburt does teach the limitation of claim 5 as suggested by Shum of:

a)   a second image and a modified version of the second image each

include a perimeter as shown by the bold lines of figure 2.8 of Heckburt.

b)   a plurality of reference points in the second image and the modified

version of the second image are vertices on the perimeters on the second image and

the modified version of the second image. Heckburt states, "In an interactive image

warper one might specify the four corners of source and destination quadrilaterals...and

wish to warp one area to the other..." as mentioned in Heckbud, page 19, first sentence

of the section "Inferring Projective Mappings". Figure 2.8 of Heckburt shows how the

four vertices are transformed from case 1 to case 3.

It would have been obvious at the time the invention was made to one of ordinary

skill in the art to modify Shum et al.'s teaching of corresponding points with Heckburt's

teaching of corresponding point, because Heckburt's corresponding points provides a

predictable transformation between images. Therefore users in 3D modeling and image

distortion software can use the mappings to provide predictable features (lines,

equispaced points, and angles) that are persevered (Heckburt, page 11, Section 2.2).

Regarding claim 6, Shum et al. and Heckburt teaches the method of claim 5, wherein:

a)   the first image includes a plurality of pixels and has a perimeter that defines a set of vertices which was addressed in claim 5, and

b)   transforming the first image based on the transformation includes:

b1)   transforming the vertices of the first image (Using fig 2.8 of Heckburt, case three is shown where the vertices of the figure on the left side of figure 2.8 is transformed to the right-hand figure of figure 2.8.); and

b2)   transforming the pixels of the first image based on the transformation of the vertices which was addressed in claim 5.

Regarding claim 7, Shum et al. and Heckburt teaches the method of claim 6, wherein:

the transformation is represented as a transformation matrix or (M_{sd}) is a forward mapping matrix as mentioned in Heckburt, page 19, section: "Inferring Projective Mappings", line 7.

Regarding claim 8, Shum et al. and Heckburt teaches the method of claim 7, wherein:

the transformation matrix is derived from the vertices of the modified version of the second image. Heckburt teaches that all points in one image (u_k, v_k) is mapped to other points (x_k, y_k) in a corresponding image using vertices ($k=0,1,2,3$) for each point.

Claim 9 is rejected the same as claim 8. Thus, argument similar to that presented above for claim 8 is equally applicable to claim 9.

Regarding claim 10, Shum et al. and Heckbud teaches the method of claim 9, wherein the transformation matrix, M, is given by the matrix equation shown in Heckburt, page 19.

Claims 11 and 13 are rejected the same as claim 4. Thus, argument similar to that presented above for claim 4 is equally applicable to claims 11 and 13.

Regarding claim 12 a reference point ("1") in the left-hand figure shown in Heckburt, fig. 2.8 is moved to another position as shown in the figure of 2.8 on the right-hand side is move relative to other reference points 0,2, and 3 to change the shape of the figure on the left side of figure 2.8 to the figure on the right-hand side of figure 2.8.

Regarding claim 14, Shum et al. and Heckburt teaches the method of claim 1, wherein:

a)   the instruction to shift perspective is received as a single user input (A user moves a virtual camera in Shum et al., fig. 2, num. 204 during the step of figure 1,num. 1104 of Shum et al. to change the current view to a new view as mentioned in Shum et al. user col. 13, lines 34,35; and

b)   the determining and transforming steps are automatically performed in response to the user input (A user is able to move and rotate the virtual camera that has a desired view of an object. The desired view is "then rendered" as mentioned in Shum et al., col. 5, lines 55-60. Thus, as the virtual camera's current view is moved a

corresponding image view is rendered using the method of figure 11.).

Claim 20 is rejected the same as claim 5. Thus, argument similar to that presented above for claim 5 is equally applicable to claim 20.

Claim 21 is rejected the same as claim 6. Thus, argument similar to that presented above for claim 6 is equally applicable to claim 21.

Claim 22 is rejected the same as claim 7. Thus, argument similar to that presented above for claim 7 is equally applicable to claim 22.

Claim 23 is rejected the same as claim 8. Thus, argument similar to that presented above for claim 8 is equally applicable to claim 23.

Claim 24 is rejected the same as claim 9. Thus, argument similar to that presented above for claim 9 is equally applicable to claim 24.

Claim 25 is rejected the same as claim 10. Thus, argument similar to that presented above for claim 10 is equally applicable to claim 25.

Claim 26 is rejected the same as claim 11. Thus, argument similar to that presented above for claim 11 is equally applicable to claim 26.

Claim 27 is rejected the same as claim 12. Thus, argument similar to that presented above for claim 12 is equally applicable to claim 27.

Claim 28 is rejected the same as claim 13. Thus, argument similar to that presented above for claim 13 is equally applicable to claim 28.

Claim 29 are rejected the same as claim 14. Thus, argument similar to that presented above for claim 14 is equally applicable to claim 29.

Conclusion

11.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.

12.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Dennis Rosario whose telephone number is 703-305-

5431. The examiner can normally be reached on 6-3.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Bhavesh Mehta can be reached on 703-308-5246. The fax phone number

for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

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DR
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PRIMARY EXAMINER